INTERNATIONAL STANDARD

ISO 22259

First edition
2019-04

Conference systems — Equipment — Requirements

Systèmes de conférence — Équipement — Exigences

Reference number
ISO 22259:2019(E)

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword ..... **v**

1 Scope **1**

2 Normative references **1**

3 Terms and definitions **1**

4 Overall conference system **5**
4.1 General 5
4.2 Audio characteristics 5
4.2.1 Latency 5
4.2.2 Sound pressure level 5
4.2.3 System input and output 6
4.2.4 Frequency response 6
4.2.5 Distortion 6
4.2.6 Noise and hum 6
4.2.7 Level consistency 6
4.2.8 Interference 6
4.3 Confidentiality 6
4.4 Markings and symbols 7
4.5 Accessibility and usability 7

5 Discussion system **7**
5.1 General 7
5.2 Discussion unit 7
5.2.1 Required elements 7
5.2.2 Additional elements 7
5.2.3 Optional features 8
5.2.4 Autonomy 8
5.3 Microphone management 8
5.4 Microphone routing 8
5.5 Microphone processing 8

6 Individual listening systems **8**
6.1 General 8
6.2 Earclip headphone 9
6.3 In-ear headphone 9
6.4 Headphones 9
6.5 Individual induction loop 9

7 Sound reinforcement system **9**

8 Interpreting system **10**

9 Language distribution system **10**

10 Metadata system **10**

11 Voting system **10**

12 Camera system **10**

13 Display system **11**

14 Identification/sign-in system **11**

15 Conference control system **11**

16 Recording/archiving system **11**

17 Webcasting system **12**

18 Teleconferencing system **12**

19 Combining of conference halls and distant connections **12**
20 Split rooms **12**
21 Diagnostics **12**
22 Interoperability **12**
Annex A (informative) **Meeting and conference hall setups** **13**
Annex B (informative) **Routing modes of a conference system** **21**
Annex C (informative) **Modes of mounting conference systems** **25**
Annex D (normative) **Microphone management** **26**
Annex E (informative) **Camera system** **28**
Annex F (informative) **Display system** **29**
Bibliography **32**

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electro technical Commission (IEC) on all matters of electro technical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 37, *Language and terminology*, Subcommittee SC 5, *Translation, interpreting and related technology*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Conference systems — Equipment — Requirements

1 Scope

This document specifies requirements for typical conference systems, the parts they are composed of, the auxiliary devices necessary for their use (such as microphones, headphones, and sound reinforcement equipment) and the environment in which they are used. These requirements ensure interoperability and optimum performance under conditions of normal operation.

It is applicable to both wired and wireless systems.

The environment and areas where events are held are described in Annex A.

This document facilitates the determination of the quality of conference systems, the comparison of different systems and the assessment of their proper use by listing their characteristics. This document contains the technical backbone of ISO 20108 and ISO 20109.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 639-3, *Codes for the representation of names of languages — Part 3: Alpha-3 code for comprehensive coverage of languages*

ISO 20108, *Simultaneous interpreting — Quality and transmission of sound and image input — Requirements*

ISO 7000, *Graphical symbols for use on equipment — Registered symbols*

IEC 60118-4, *Electroacoustics — Hearing aids — Part 4: Induction-loop systems for hearing aid purposes — System performance requirements*

IEC 60268-4, *Sound system equipment — Part 4: Microphones*

IEC 60268-7, *Sound system equipment — Part 7: Headphones and earphones*

IEC 60417, *Graphical symbols for use on equipment*

IEC 61603-7, *Transmission systems of audio and/or video and related signals using infra-red radiation — Part 7: Digital audio signals for conference and similar applications*

IEC 62489-1, *Electroacoustics — Audio-frequency induction loop systems for assisted hearing — Part 1: Methods of measuring and specifying the performance of system components*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
system
combination of interacting elements organized to achieve a given objective

[SOURCE: ISO/IEC 30111:2013, 3.6, modified — the wording “one or more stated purposes” is changed to “a given objective”.]

3.2
wired
employing cables and connectors for the transfer of *signals* (3.12) and data

3.3
wireless
without cables and connectors for the transfer of *signals* (3.12) and data

3.4
discussion system
system (3.1) that controls *discussion units* (3.23)

3.5
sound reinforcement system
speech reinforcement system
public address system
system (3.1) that amplifies *sound* (3.11)

3.6
conference system
system (3.1) that controls technical equipment used to conduct an event

3.7
language distribution
transmission of the *floor* (3.9) and *interpreted* (3.32) speech to *participants* (3.25) and *audience* (3.28)

3.8
interpreting system
combination of *interpreting* (3.33) equipment and *system* (3.1) for *language distribution* (3.7)

Note 1 to entry: An interpreting system can require the use of interpreting booths compliant with ISO 2603 or ISO 4043, equipped with interpreting consoles compliant with ISO 20109, or a portable interpreting system compliant with ISO 20109.

3.9
floor
audio output of *discussion system* (3.4) conveying *microphone* (3.14) input and *auxiliary input* (3.10)

3.10
auxiliary input
audio input other than that from *discussion system* (3.4) *microphones* (3.14)

3.11
sound
form of energy that moves through media in waves of pressure

[SOURCE: ISO/TS 16976-7:2013, 3.1.5]

3.12
signal
detectable transmitted energy that is used to carry information

[SOURCE: ISO/IEC 14776-153:2015, 3.1.87]

3.13
transducer
device that converts one type of energy to another

[SOURCE: ISO/TS 19130-2:2014, 4.78]

3.14
microphone
transducer (3.13) that converts *sound* (3.11) into an electrical *signal* (3.12)

[SOURCE: ISO 20109:2016, 3.3, modified — The word "device" is replaced by "transducer".]

3.15
loudspeaker
transducer (3.13) that converts an electrical *signal* (3.12) into *sound* (3.11) that is loud enough to be heard at a distance

3.16
amplifier
electronic device that converts a small *signal* (3.12) to a larger signal

[SOURCE: ISO 5577:2017, 5.1.5, modified — The word "which" is replaced by "that"; Note 1 to entry is removed.]

3.17
headphone
transducer (3.13) that converts an electrical *signal* (3.12) into *sound* (3.11), designed to be worn close to the ear

[SOURCE: ISO 20109:2016, 3.4, modified — the plural term "headphones" is replaced by the singular "headphone", the word "device" is replaced by "transducer".]

3.18
in-ear headphone
headphone (3.17) designed to be worn inside the ear

3.19
earclip headphone
earshell headphone
one-ear *headphone* (3.17) designed to be worn attached to the ear

3.20
induction loop
system (3.1) that transmits an audio *signal* (3.12) directly to a hearing aid

Note 1 to entry: The audio signal is transmitted via a magnetic field, greatly reducing background noise, competing sounds, reverberation and other acoustic distortions in order to improve the clarity of sound.

3.21
central controller
equipment that directs the operation of the *conference system* (3.6) and the *systems* (3.1) and devices connected to it

3.22
audio mixing device
equipment for combining, routing and changing the gain, volume, timbre and dynamics of analogue or digital *signals* (3.12), summing them to produce one or more combined output signals

3.23
discussion unit
electronic device serving a *participant* (3.25) to speak at an event

3.24
control booth
room from which technical equipment and audio and video *signal* (3.12) quality are managed

[SOURCE: ISO 2603:2016, 3.3, modified — The wording "where the control instruments are located, and" is deleted and "audio and video signal quality" added.]

3.25
participant
person who takes an active part in an event

3.26
chairperson
participant (3.25) who is in charge of conducting the proceedings at an event

3.27
speaker
participant (3.25) addressing others

[SOURCE: ISO 18841:2018, 3.1.7, modified — The word "person" is replaced by "participant"; the wording "using either spoken language or sign language" is removed.]

3.28
audience
group of listeners or spectators at an event

3.29
operator
person responsible for the operation of technical equipment

3.30
technician
person responsible for the availability and maintenance of technical equipment

3.31
webcasting
web streaming
transmitting audio and video data across a network to an *audience* (3.28)

3.32
interpret
render spoken or signed information from a source language to a target language in oral or signed form, conveying both the register and meaning of the source language content

[SOURCE: ISO 18841:2018, 3.1.1]

3.33
interpreting
interpretation
rendering of spoken or signed information from a source language to a target language in oral or signed form, conveying both the register and meaning of the source language content

[SOURCE: ISO 18841:2018, 3.1.2]

3.34
simultaneous interpreting
mode of *interpreting* (3.33) performed while a *speaker* (3.27) is still speaking or signing

[SOURCE: ISO 18841:2018, 3.1.13]

4 Overall conference system

4.1 General

A conference system consists of the technical equipment used to conduct an event. Its primary function is to amplify audio signals from participants and audio sources and delivering them to other participants.

A conference system shall at least consist of a discussion system, combined with a listening system and/or a sound reinforcement system.

A conference system shall have at least one primary floor output and one auxiliary input as described in Annex B.

A conference system can be extended with an interpreting system and a language distribution system.

A conference system may, among others, also include one or more of the following elements:

— a metadata system;

— a voting system;

— a camera system;

— a display system;

— an identification/sign-in system;

— an electronic nameplate system.

A conference system can, among others, be connected to one or more of the following elements:

— a conference control system;

— an audio and/or video recording/archiving system;

— a webcasting system;

— a teleconferencing system.

Audio and video signals generated by the conference system shall comply with ISO 20108.

Modes of mounting conference systems are described in Annex C.

4.2 Audio characteristics

4.2.1 Latency

The overall latency from input (microphone or audio input) to output (discussion unit loudspeaker, headphones or audio output) shall not exceed 20 ms.

4.2.2 Sound pressure level

All sound pressure levels (dB_{spl}) referred to in this document are based on a sinusoidal frequency of 1 kHz (unless specified otherwise) measured under free field conditions.

Sound pressure level	Nominal	Maximum	Units
at the microphone housing/capsule	80	110	dB_{spl}
at 50 cm from the discussion unit loudspeaker without causing audible artefacts	72		dB_{spl}

4.2.3 System input and output

The nominal input and output of the system shall be −30 dBFS.

4.2.4 Frequency response

A conference system including microphone and individual listening system shall reproduce audio frequencies between 125 Hz and 15 000 Hz with a variation of maximum ±10 dB.

A conference system excluding microphone and individual listening system shall reproduce audio frequencies in the useful frequency range with a variation of maximum ±3 dB.

Additionally, a high-pass filter shall attenuate the frequencies below 125 Hz with a slope of at least 12 dB per octave in order to improve speech intelligibility.

Parameter	Min.	Typical	Max.	Unit
Low frequency limit			125	Hz
High frequency limit	15 000			Hz
Amplitude variation in the useful frequency range including microphone and individual listening system			±10	dB
Amplitude variation in the useful frequency range excluding microphone and individual listening system			±3	dB
High-pass filter corner frequency		125		Hz
High-pass filter slope	12			dB/Oct

Microphones shall comply with IEC 60268-4. Headphones shall comply with IEC 60268-7.

4.2.5 Distortion

A conference system shall be free of any perceptible audio distortion.

A conference system including a microphone shall exhibit a total harmonic distortion (THD) level below 1 % at any sound pressure levels up to 110 dB_{spl} at 1 kHz.

4.2.6 Noise and hum

A conference system shall be free of perceptible noise and hum.

A conference system including a microphone shall exhibit a signal to noise ratio (SNR) of at least 90 dB at 1 kHz at the maximum sound pressure level.

4.2.7 Level consistency

The variation of the level of the individual listening system shall be no more than ±3 dB for each distributed interpreted language and distributed floor at an input level of 80 dB_{spl} ± 12 dB.

4.2.8 Interference

A conference system shall be immune to interference from any source, including nearby electromagnetic sources such as (but not limited to) mobile phones, wireless LANs and other conference systems. Audible artefacts resulting from interference shall be at least 50 dB below the nominal level; system noise shall not be considered as audible interference.

4.3 Confidentiality

A conference system can include features that warrant the confidentiality of the event, in particular when wireless systems are used, the conference is accessible via webcasting or when the audio and/or video are transmitted over a LAN/WAN.

4.4 Markings and symbols

Markings and symbols shall be those identified in the collection of graphical symbols for use on equipment that contains the complete set of graphical symbols included in IEC 60417 and ISO 7000.

Markings not included in this collection shall be clearly identified in the user manual.

4.5 Accessibility and usability

Physically impaired participants and audience members should be able to use all features of the conference system without assistance (see ISO/IEC Guide 71 and ISO/TR 22411).

5 Discussion system

5.1 General

A discussion system consists of discussion units, often daisy-chained together and connected to a central controller that can power the discussion units. It can be operated centrally by an operator and/or in a decentralized way by the participants. In general, the number of discussion units is the same as the number of participants; however, two participants can share one unit. The connection between the discussion units and the central controller can be either wired or wireless.

The entire discussion system's audio signal path shall be digital.

5.2 Discussion unit

5.2.1 Required elements

The unit shall contain:

— a microphone with a polar pattern that provides the best intelligibility, taking into account the speaker's position, and that avoids ambient noises to be picked up;

— a microphone button that provides adequate haptic perception to locate it and haptic feedback to operate it. The operation of the microphone button should not result in audible artefacts;

— an indicator near the button to show that the microphone is ON. The indicator should be coloured red;

— an indicator near the button to show that the participant is placed in the queue. The indicator should be coloured green.

The chairperson's unit shall contain:

— a priority button that provides adequate haptic perception to locate it and haptic feedback to operate it. Pressing this button can activate a chime and shall temporarily mute or switch OFF all other microphones.

5.2.2 Additional elements

The unit can, among others, contain:

— an indicator visible for the participants or the audience to show the microphone status. The indicator shall have the same colour as the microphone button indicator;

— a non-locking socket to connect an individual listening system. The socket shall be compatible with a TS, TRS and TRRS mini-jack plug of 3,5 mm. In case two participants use the unit, it shall have two connectors;